

09/926796 PCT/PTO 20 DEC 2001

Form PTO-1390

P21760.P01

U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NUMBER

P21760

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

09/926796

INTERNATIONAL APPLICATION NO.

PCT/AT00/00167

INTERNATIONAL FILING DATE

21 June 2000

PRIORITY DATE CLAIMED

21 June 1999

TITLE OF INVENTION

ELECTRIC MOTOR

APPLICANT(S) FOR DO/EO/US

Manfred SCHROEDL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☒ This is an express request to promptly begin national examination procedures (35 U.S.C. 371(f)).
4. ☒ The US has been elected by the expiration of 19 months from the priority date (PCT Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☒ is attached hereto (required only if not communicated by the International Bureau).
 - b. ☒ has been communicated by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371 (c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are attached hereto (required only if not communicated by the International Bureau).
 - b. ☐ have been communicated by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☒ have not been made and will not be made.
8. ☐ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3))
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
"EXECUTED"
10. ☒ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (U.S.C. 371(c)(5)).

Items 11 to 16 below concern other document(s) or information included:

11. Assignee: _____
12. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
13. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
14. ☒ A FIRST preliminary amendment.
☐ A SECOND or SUBSEQUENT preliminary amendment.
15. ☐ A substitute specification.
16. ☐ A change of power of attorney and/or address letter.
17. ☒ Figure of Drawing to be published 1
18. ☒ Other items or information:

International Application as published (in German).
PCT/IPEA/416 (in Germany).
PCT/IPEA/409 International Preliminary Examination Report with five sheets of Amended pages (in German)
PCT/IB/345.
PCT/IB/304.
PCT/IB/308.
PCT/RO/101 PCT Request (in German).
Cover Letter Submitting Replacement Pages.
PCT/ISA/210 (in English and German).
Claim of Priority.

U.S. APPLICATION NO. (If known, see 37 CFR 1.5)

INTERNATIONAL APPLICATION NO.

ATTORNEY'S DOCKET NUMBER

09/926796

CT/AT00/00167

P21760

19. ☒ The following fees are submitted:

CALCULATIONS

PTO USE ONLY

Basic National Fee (37 CFR 1.492(a)(1)-(5)):

Search report has been prepared by the EPO or JPO. \$ 890.00

International preliminary examination fee paid to USPTO (37 CFR 1.482). \$ 710.00

No international preliminary examination fee paid to USPTO (37 CFR 1.482) but international search fee paid to USPTO (37 CFR 1.445(a)(2)). \$ 740.00

Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO. \$1,040.00

International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4). \$ 100.00

ENTER APPROPRIATE BASIC FEE AMOUNT =

\$ 890.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).

\$ 0.00

Claims

Number Filed

Number Extra

RATE

\$ 0.00

Total Claims

28

- 20 =

8

X \$18.00

\$ 144.00

Independent Claims

1

- 3 =

0

X \$84.00

\$ 0.00

Multiple dependent claim(s) (if applicable)

+ \$280.00

\$ 0.00

TOTAL OF ABOVE CALCULATIONS =

\$1,034.00

☒ Applicant claims small entity status. See 37 CFR 1.27. The fees indicated above are reduced by 1/3.

\$ 517.00

SUBTOTAL =

517.00

Processing fee of \$130.00 for furnishing the English translation later than ___ 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).

+

0.00

Extension of Time fee in the amount of \$

0.00

TOTAL NATIONAL FEE =

517.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+

0.00

TOTAL FEES ENCLOSED =

517.00

Amount to be refunded

\$

Charged

\$

a. ☒ A check in the amount of \$517.00 to cover the above fees is enclosed.

b. ___ Please charge my Deposit Account No. ___ in the amount of \$ ___ to cover the above fees.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 19-0089.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO CUSTOMER NO. 7055
AT THE PRESENT ADDRESS OF:Neil F. Greenblum
GREENBLUM & BERNSTEIN, P.L.C.
1941 Roland Clarke Place
Reston, VA 20191
(703) 716-1191

SIGNATURE

Neil F. Greenblum
NAME

28,394

REGISTRATION NUMBER

P21760.A02

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Manfred SCHROEDL
Group Art Unit: Unknown
Serial No. : U.S. National Phase of PCT/AT00/00167
Examiner: Unknown
Filed : I.A. Filed June 21, 2000
For : ELECTRIC MOTOR

**PRELIMINARY AMENDMENT
AND
COVER LETTER SUBMITTING REPLACEMENT CLAIMS**

Commissioner of Patents and Trademarks
Washington, DC 20231

Sir :

Enclosed please find a copy of the International Preliminary Examination Report (Report) and its Annex including replacements claims 1-28 upon which the Report is established. Applicant submits herewith an English translation of claims 1-28 of the Annex, and request examination based upon these claims.

Additionally, prior to the examination of the above-identified application, the amendment of replacements claims 1-28 so as to remove multiple dependent claims is respectfully requested.

IN THE CLAIMS

Please amend claims 3-28 as follows (clean copy, a marked-up version of the amended claims is submitted in the Appendix attached at the end of this Amendment):

3. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first electric motor (10) is mechanically connected via the rotor (5) thereof to a rotating shaft or to the shaft of a combustion engine mechanically connected to the rotating shaft.

4. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the electric motor (10) is mechanically connected via a gearbox to the combustion engine.

5. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first electric motor (10) is a part of the combustion engine, e.g. that the rotor (5) of the first electric motor (10) is integrated in the flywheel of the combustion engine.

6. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first electric motor (10) is connected to at least one external electric circuit, preferably a machine's mains (14).

7. (Amended) Electric machine in accordance with Claim 1, characterized by the fact that the first (10) and second electric motor (11) are mounted in a casing (9).

8. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first (10) and/or the second electric motor (11) are designed as an asynchronous, synchronous or reluctance motor.

9. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first (10) and second electric motor (11) have rotors (5, 6) with the same axis of rotation.

10. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that one of the two motors (10, 11) is designed as an inner rotor and the other motor is designed as an outer rotor.

11. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the two electric motors (10, 11) have a mutual stator plate package.

12. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the components for electric power exchange between the electric motors (10, 11) and/or an external electric circuit (14) are mounted in a casing (9) with at least one electric motor (10, 11).

13. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the casing (9) of at least one electric motor (10, 11) has a liquid cooling system.

14. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that a mains connection with direct current, alternating current or three-phase current can be derived from the electric circuit connecting the two electric motors.

15. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the stator (1, 4) of at least one electric motor (10, 11) has at least two winding systems (22, 23), preferably galvanically separated in the motor (10, 11), that are coupled magnetically with the main flux of the motor (10, 11).

16. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the at least two winding systems (22, 23) are connected via separate electronic power circuits (24, 25) with the relevant, preferably galvanically separated power circuits.

17. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that at

P21760.A02

least one winding system (22, 23) is connected via a rectifier bridge to a direct current or battery-fed mains, preferably a machine's mains (26) for power exchange in one direction.

18. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that at least one winding system (22, 23) is connected via a transistor bridge to a direct current or battery-fed mains, preferably a machine's mains (26) for power exchange in both directions.

19. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that with at least one of the winding systems (22, 23) the motor can be operated as a generator for charging the connected machine's mains (26) and as a motor, preferably as the starter for a mechanically coupled combustion engine.

20. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that via the at least two winding systems (22, 23), a galvanically separable electric power exchange between the circuits connected to the winding systems (22, 23) is possible.

21. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the winding systems (22, 23) controlled via the electronically controlled switches take over the control of the electric parameters from winding systems coupled via non-controllable electronic power elements, preferably diodes.

22. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that each winding system (22, 23) is connected, galvanically independent of the other winding system (22, 23), with electromechanical function groups on generally different voltage levels.

23. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that an electromagnetic power exchange between the winding systems (22, 23) independent of rotor rotation

P21760.A02

according to the transformer principle is possible through close magnetic coupling of the winding systems (22, 23).

24. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that a slight electromagnetic influence on the winding systems (22, 23) results from weak magnetic coupling of the winding systems (22, 23).

25. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that a freely selectable electromagnetic power exchange between the winding systems (22, 23) and the rotor shaft can be achieved by controlling the electromagnetic parameters, preferably the currents and flux linking, of at least one winding system (22, 23).

26. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first and second electric motor (10, 11) are mounted in a casing.

27. (Amended) Electric motor in accordance with 1, characterized by the fact that the first and/or the second electric motor (10, 11) are designed as an asynchronous, synchronous or reluctance motor.

28. (Amended) Electric motor in accordance with Claim 1, characterized by the fact that the first and second electric motor (10, 11) have rotors with the same axis of rotation.

Remarks

The changes above were made simply to remove multiple dependency in the claims.

Should the Examiner have any further comments or questions, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Appendix**Marked-Up Copy of Amended Claims**

3. (Amended) Electric motor in accordance with Claim 1 [or 2], characterized by the fact that the first electric motor (10) is mechanically connected via the rotor (5) thereof to a rotating shaft or to the shaft of a combustion engine mechanically connected to the rotating shaft.

4. (Amended) Electric motor in accordance with Claim 1 [or 2], characterized by the fact that the electric motor (10) is mechanically connected via a gearbox to the combustion engine.

5. (Amended) Electric motor in accordance with Claim 1 [or 2], characterized by the fact that the first electric motor (10) is a part of the combustion engine, e.g. that the rotor (5) of the first electric motor (10) is integrated in the flywheel of the combustion engine.

6. (Amended) Electric motor in accordance with [at least one of Claims 1 to 5] Claim 1, characterized by the fact that the first electric motor (10) is connected to at least one external electric circuit, preferably a machine's mains (14).

7. (Amended) Electric machine in accordance with [at least one of Claims 1 to 6] Claim 1, characterized by the fact that the first (10) and second electric motor (11) are mounted in a casing (9).

8. (Amended) Electric motor in accordance with [at least one of Claims 1 to 7] Claim 1, characterized by the fact that the first (10) and/or the second electric motor (11) are designed as an asynchronous, synchronous or reluctance motor.

9. (Amended) Electric motor in accordance with [at least one of Claims 1 to 8] Claim 1, characterized by the fact that the first (10) and second electric motor (11) have rotors (5, 6) with the

same axis of rotation.

10. (Amended) Electric motor in accordance with [at least one of Claims 1 to 9] Claim 1, characterized by the fact that one of the two motors (10, 11) is designed as an inner rotor and the other motor is designed as an outer rotor.

11. (Amended) Electric motor in accordance with [at least one of Claims 1 to 10] Claim 1, characterized by the fact that the two electric motors (10, 11) have a mutual stator plate package.

12. (Amended) Electric motor in accordance with [at least one of Claims 1 to 11] Claim 1, characterized by the fact that the components for electric power exchange between the electric motors (10, 11) and/or an external electric circuit (14) are mounted in a casing (9) with at least one electric motor (10, 11).

13. (Amended) Electric motor in accordance with [at least one of Claims 1 to 12] Claim 1, characterized by the fact that the casing (9) of at least one electric motor (10, 11) has a liquid cooling system.

14. (Amended) Electric motor in accordance with [at least one of Claims 1 to 13] Claim 1, characterized by the fact that a mains connection with direct current, alternating current or three-phase current can be derived from the electric circuit connecting the two electric motors.

15. (Amended) Electric motor in accordance with [at least one of Claims 1 to 14] Claim 1, characterized by the fact that the stator (1, 4) of at least one electric motor (10, 11) has at least two winding systems (22, 23), preferably galvanically separated in the motor (10, 11), that are coupled magnetically with the main flux of the motor (10, 11).

16. (Amended) Electric motor in accordance with [at least one of Claims 1 to 15] Claim 1,

P21760.A02

characterized by the fact that the at least two winding systems (22, 23) are connected via separate electronic power circuits (24, 25) with the relevant, preferably galvanically separated power circuits.

17. (Amended) Electric motor in accordance with [at least one of Claims 1 to 16] Claim 1, characterized by the fact that at least one winding system (22, 23) is connected via a rectifier bridge to a direct current or battery-fed mains, preferably a machine's mains (26) for power exchange in one direction.

18. (Amended) Electric motor in accordance with [at least one of Claims 1 to 17] Claim 1, characterized by the fact that at least one winding system (22, 23) is connected via a transistor bridge to a direct current or battery-fed mains, preferably a machine's mains (26) for power exchange in both directions.

19. (Amended) Electric motor in accordance with [at least one of Claims 1 to 18] Claim 1, characterized by the fact that with at least one of the winding systems (22, 23) the motor can be operated as a generator for charging the connected machine's mains (26) and as a motor, preferably as the starter for a mechanically coupled combustion engine.

20. (Amended) Electric motor in accordance with [at least one of Claims 1 to 19] Claim 1, characterized by the fact that via the at least two winding systems (22, 23), a galvanically separable electric power exchange between the circuits connected to the winding systems (22, 23) is possible.

21. (Amended) Electric motor in accordance with [at least one of Claims 1 to 20] Claim 1, characterized by the fact that the winding systems (22, 23) controlled via the electronically controlled switches take over the control of the electric parameters from winding systems coupled via non-controllable electronic power elements, preferably diodes.

22. (Amended) Electric motor in accordance with [at least one of Claims 1 to 21] Claim 1, characterized by the fact that each winding system (22, 23) is connected, galvanically independent of the other winding system (22, 23), with electromechanical function groups on generally different voltage levels.

23. (Amended) Electric motor in accordance with [at least one of Claims 1 to 22] Claim 1, characterized by the fact that an electromagnetic power exchange between the winding systems (22, 23) independent of rotor rotation according to the transformer principle is possible through close magnetic coupling of the winding systems (22, 23).

24. (Amended) Electric motor in accordance with [at least one of Claims 1 to 23] Claim 1, characterized by the fact that a slight electromagnetic influence on the winding systems (22, 23) results from weak magnetic coupling of the winding systems (22, 23).

25. (Amended) Electric motor in accordance with [at least one of Claims 1 to 24] Claim 1, characterized by the fact that a freely selectable electromagnetic power exchange between the winding systems (22, 23) and the rotor shaft can be achieved by controlling the electromagnetic parameters, preferably the currents and flux linking, of at least one winding system (22, 23).

26. (Amended) Electric motor in accordance with [at least one of Claims 1 to 25] Claim 1, characterized by the fact that the first and second electric motor (10, 11) are mounted in a casing.

27. (Amended) Electric motor in accordance with [at least one of Claims 1 to 26] Claim 1, characterized by the fact that the first and/or the second electric motor (10, 11) are designed as an asynchronous, synchronous or reluctance motor.

28. (Amended) Electric motor in accordance with [at least one of Claims 1 to 27] Claim 1,

P21760.A02

characterized by the fact that the first and second electric motor (10, 11) have rotors with the same axis of rotation.

6/PRTS

09/926796
531 Rec'd PCT 20 DEC 2001

P21760.S01

1

PCT/AT00/00167

/ Electric Motor

The invention relates to an electric motor, preferably of the three-phase current design.

5

Electric motors are being used more and more in automotive engineering. Systems that handle the power exchange on the machine voltage level are known, such as the ISAD system (integrated starter-alternator-damper system).

10

Furthermore, electrically operated turbochargers are known, in which the power exchange also takes place on the machine voltage level. Thereby, the turbocharger capacity is derived entirely from the machine's mains.

15

The aim of this invention is to create an electric motor that can be used especially in automotive engineering and that provides sufficient electric power or different levels of voltage for the supply of two different mains, especially for the turbocharger.

20

The problem is solved by this invention. The electric motor according to this invention is characterized by the fact that a first electric motor is provided, which is mechanically connected via the rotor thereof to a rotating shaft of an engine, especially of an internal combustion engine, that in addition at least one second electric motor is provided, that the second electric motor is mechanically coupled via the rotor thereof to a rotating part of a mechanical aggregate, especially to a turbo-engine, and that the first electric motor is electrically coupled to at least the second electric motor in order to exchange electric power at a freely selectable voltage level. With this invention, it is possible for the first time to create a separate, autarkic, internal electric circuit that is independent from the voltage level of the machine's mains. With this, the motor according to the invention and the electronic power circuits can be designed with optimal operating voltages. It is also known that it is usually more advantageous to transport electric power at higher voltages than those currently common in the machine's mains.

30

09/926796 "42204"

This internal electrical component is connected with the first motor through electronic power components such as diodes and transistors and via circuits in accordance with the state of the art, in order to design the internal electrical component in terms of its electric ratios, such as voltages and currents and their time curves.

5

The first motor can supply and discharge mechanical torque via the combustion engine, so that the first motor can work as a generator when power is consumed, and it discharges this energy to the internal electrical part in the form of electric power. If the first motor draws electric power from the internal electric part, it works as a motor and can use this torque e.g. to start the combustion engine or to support or optimise its operation.

10

In a special feature of the invention, the first electric motor is mechanically connected via the rotor thereof to a rotating shaft or to the shaft of a combustion engine mechanically connected to the rotating shaft. As a result, the mechanical torque between the first electric motor and the combustion engine can easily be exchanged.

15

In accordance with one embodiment of the invention, the first electric motor is mechanically connected to the combustion engine via a gearbox. This design solution also improves the torque at low revs in an electrically driven turbocharger.

20

In accordance with another embodiment of the invention, the first electric motor is a part of the combustion engine, e.g. the rotor in the first electric motor is integrated in the flywheel of the combustion engine. The advantage of this design solution lies mainly in the fact that the entire arrangement can be produced in a relatively compact manner.

25

In accordance with a special feature of the invention, the first electric motor is connected to at least one external electric circuit, preferably a machine's mains. This second electric coupling is connected to the machine's mains via an electronic voltage adjustment circuit in accordance with the state of the art. As a result, power can be

30

exchanged between the internal electric part and the machine's mains. Thus, the first electric motor in accordance with the invention can be operated as a starter in one power direction and as a machine's mains charging device in the other direction.

5 In accordance with a further embodiment of the invention, the first and second electric motors are mounted in a casing. With this embodiment, it is possible to produce an electric drive system that can be manufactured and used economically. The advantage of this invention is the fact that, unlike the known electromagnetic drives or purely mechanical drives, such as gears in which two different, usually independent speeds are
10 required, major parts such as the casing elements, parts of the controls, can be spared. In addition, the well-known local EMC problems in the casing can be solved and do not penetrate into the surroundings.

In accordance with a further embodiment of the invention, the first and/or second
15 electric motor(s) is/are designed as asynchronous, synchronous or reluctance motor. Thus, the optimal motor can be chosen for each individual application.

In accordance with a further feature of the invention, the first and second electric motors have rotors with the same axis of rotation. Especially in automotive engineering it is an
20 advantage if there is only one axis of rotation for a mechanic-electric-mechanic coupling.

In accordance with a special embodiment of the invention, one of the two motors is designed as an inner rotor and the other motor as an outer rotor. This embodiment of the invention also allows a compact motor design.

25 In accordance with a further feature of the invention, the two electric motors have one mutual stator plate package. In this embodiment, a stator with at least one stator coil and at least two rotors can be provided in one casing. The rotors are mechanically separated, and each rotor has electromagnetic interaction with the electromagnetically active stator, whereby the rotor speeds may be the same or different.

30 In accordance with a further embodiment of the invention, the components for

electric power exchange between the electric motors and/or an external electric circuit are mounted in the casing of at least one electric motor. This embodiment serves primarily to create a compact electric motor for automotive engineering.

5 In a further embodiment of the invention, the casing of at least one electric motor has a liquid cooling system. As a result, the frictional heat of the coils and also of the electronic power elements, which may occur due to the known problems with the high currents in the motor, can be discharged optimally.

10 In accordance with another feature of the invention, a mains connection with direct, alternating or three-phase current can be derived from the electric circuit connecting the two electric motors. In this embodiment, an additional three-phase, alternating or direct current network can be provided by the internal electric circuit. For example, a strong 230 V supply or 3x400 V supply can be decoupled, whereby the
15 frequency can be specified either internally or externally. Thus, the machine's mains and the aggregates connected to it are connected to this supply in terms of power via the internal electric circuit.

As a result, the combustion engine can be started from the power supply without requiring the machine's mains, for example, or vice versa the combustion engine can
20 support or charge an existing supply. It is also possible to charge the machine's mains battery from the supply in a simple manner.

In accordance with a special feature of the invention, the stator of at least one electric motor has at least two winding systems, preferably separated galvanically within
25 the motor, which are mechanically coupled with the motor's main current. With this embodiment of the invention, it is possible to create two autarkic electric circuits with independent voltage levels. Another advantage of this invention is the fact that electromagnetic or EMC interference from switching in one winding system can be suppressed in another winding system. Moreover, the individual winding systems can
30 work advantageously at different voltage levels, especially galvanically separate ones. Specific galvanic separation and/or a transformer for voltage adjustment between the two

electric circuits involved is no longer required.

In accordance with a special feature of the invention, at least two winding systems are connected via separate electronic power switches with the relevant, preferably galvanically separated power circuits. This offers the advantage that for example a mains supply, especially a machine's mains can be operated and controlled separately from another mains supply.

In accordance with a further embodiment of the invention, at least one winding system is connected via a rectifier bridge with a direct current or battery-fed mains, preferably a machine's mains, for power exchange in one direction. With this embodiment, more economic, or even cheaper electronic power components can be used for charging.

In accordance with a further feature of the invention, at least one winding system is connected via a transistor bridge with a direct current or battery-fed mains, preferably a machine's mains, for power exchange in both directions. This offers the advantage that a separate starter is not required, or power is drawn from one mains, preferably the machine's mains, and fed into the other mains.

In accordance with a special feature of the invention, the motor with at least one of the winding systems can be operated as a generator for charging the connected machine's mains, and also as a motor, preferably as a starter for a mechanically coupled combustion engine. This embodiment also offers the advantage that the starter, but also the generator can be eliminated in the design.

In accordance with a further embodiment of the design, galvanically separated electric power exchange via the at least two winding systems is possible between the electric circuits connected to the winding systems. This allows the advantageous separation of the machine's mains from the second mains, which may well have a higher voltage.

In accordance with a further embodiment of the invention, the winding systems controlled via the electronically controlled switches take over the control of the electric parameters from winding systems coupled via non-controllable electronic power elements, preferably diodes. Thereby it is advantageous that for the control of the charging process no separate controllable elements are required and instead the controllable elements of the second mains can be used.

In accordance with a further feature of the invention, each winding system – galvanically independent from the other winding system – is connected with electromechanical function groups on generally different voltage levels. Thus, the electromechanical function groups, e.g. an electrically operated oil pump or water pump, or an electromagnetically operated valve control for in- and output valves or motor valves, or an electrically operated ventilator can be operated independent of the power limitation of the direct current or the battery at an advantageous voltage and/or current level.

In accordance with a special embodiment of the invention, an electromagnetic power exchange between the winding systems independent of rotor rotation according to the transformer principle is possible through close magnetic coupling of the winding systems. This offers the advantage that even when the rotor is stationary a power transfer to the relatively closely coupled other winding system is possible via a time-variable voltage through suitable electronic actuators on one winding system.

In accordance with a further feature of the invention, a slight electromagnetic influence on the winding systems results from weak magnetic coupling of the winding systems. This offers the advantage that electromagnetic interference due to switching processes in one winding system hardly takes effect in the other winding system.

In accordance with a further embodiment of the invention, a freely selectable electromagnetic power exchange between the winding systems and the rotor shaft can be achieved by controlling the electromagnetic parameters, preferably the currents and flux

linking, of at least one winding system. This embodiment offers the advantage that mechanical and electric energy is provided in accordance with the current, optimal strategy.

5 In accordance with a further embodiment of the invention, a first and second electric motor is mounted in a casing. With this embodiment, it is possible to produce an electric drive system that can be manufactured and used economically. The advantage of this invention is the fact that, unlike the known electromagnetic drives or purely mechanical drives, such as gears in which two different, usually independent speeds are required, major parts such as the casing elements, parts of the controls, can be spared. In addition, the well-known local EMC problems in the casing can be solved and do not penetrate into the surroundings.

10 In accordance with a further embodiment of the invention, the first and/or second electric motor(s) is/are designed as asynchronous, synchronous or reluctance motor. Thus, the optimal motor can be chosen for each individual application.

15 In accordance with a further feature of the invention, the first and second electric motors have rotors with the same axis of rotation. Especially in automotive engineering it is an advantage if there is only one axis of rotation for a mechanic-electric-mechanic coupling.

20 The invention is explained in more detail based on the design examples illustrated in the figure.

25 Fig. 1 shows an electric motor with rotors with the same axis of rotation,

Fig. 2 a basic sketch of the electrical circuit of the motor,

30 Fig. 3 the electric motor with the electronic elements,

Fig. 4 and 5 an embodiment of the electric motor,

Fig. 6 a basic sketch of an electrical circuit of the motor, and

5 Fig. 7 an interconnection between a generator and a compressor engine via a converter.

By way of introduction, it is noted that in the described embodiment the same parts and the same states are allocated the same reference numbers and the same component names, whereby the disclosures contained throughout the description can be
10 applied by analogy to the same parts and the same states with the same reference numbers or same component names. Furthermore, position details given in the description, e.g. top, bottom, side, etc., relate to the figure being described and illustrated at the time and with a change of position should be transferred accordingly to the new position.

Moreover, individual features or combinations of features from the different
15 embodiments illustrated can represent independent solutions according to the invention in themselves. The relevant tasks and solutions according to the invention are shown in the detailed descriptions of these figures.

Basically, various design variations for such electric motors are possible. Fig. 1
20 shows a first electric motor 10 with one stator 1, which has one winding 2. In the cylindrical motor array, one winding 2 is on the inside of the stator 1 or the stator bore, and can be designed as a groove or air-gap winding. The second electric motor 11 has one winding 3 on the outside of the stator 4 as a groove or air-gap winding, whereby winding
25 2 interacts with a rotor 5 designed as an inner rotor, and winding 3 interacts with a rotor 6 designed as an outer rotor. The rotors 5, 6 can be designed with permanent magnet excitation, as cage rotors, with a reluctance structure, etc. The two rotors 5, 6 are mounted mechanically on one suitable bearing 7, 8 each according to the state of the art in the casing 9.

30 As already mentioned, the main application for such an electric motor 10, 11 is

in the field of automotive engineering, whereby it can fulfil several functions. The first electric motor 10 is mechanically coupled with the combustion engine, e.g. via a gearbox with a rotating shaft, or the first motor 10 with its rotor 5 is located directly on an existing element of the combustion engine, such as e.g. the gear flywheel or an existing drive wheel, or it is structurally integrated with this component. This first motor 10 can thus supply and discharge mechanical torque with the combustion engine, so that the first motor 10 can work as a generator when power is consumed, and it discharges this energy to the internal electrical part in the form of electric power. If the first motor 10 draws electric power from the internal electric part, it works as a motor and can use this torque to start the combustion engine or to support or optimise its operation.

In accordance with Fig. 2, the first electric motor 10 and the second electric motor 11 are each connected to a control or power component 12, 13. For the exchange of electric power at freely selectable voltage levels, the two control and power components 12, 13, which also perform the electronic power conversion, are connected to each other. This internal electric circuit is connected with the first motor through electronic power components, such as diodes and transistors and via circuits in accordance with the state of the art, in order to design the internal electrical component in terms of its electric parameters, such as voltages and currents and their time curves. An important feature of this internal electric circuit and thus of the voltage level of the first motor is the independence of the voltage level from an external electric circuit, the so-called machine's mains 14. Thus, the motors in accordance with the invention and the electronic power circuits can be designed with optimal operating voltages. It is known that it is usually more advantageous to transport electric power at higher voltages than those currently common in the machine's mains.

25

This external machine's mains 14 is connected to the internal electric circuit via an additional control or power component 15.

This also offers a major advantage of this arrangement, since the mechanical power exchange between the combustion engine and one or more additional aggregates, such as turbochargers, pumps, ventilators, compressors, etc., can be provided without

using the machine's mains. In addition to the optimal voltage level, the arrangement also offers significantly improved EMC properties, since with simple measures in accordance with the state of the art the EMV interference is not able to penetrate the machine's mains 14 or generally the environment of the aggregate and only has to be controlled within the aggregate. Moreover, with this arrangement it is possible to transfer significantly more power for the supply of secondary aggregates independent of the speed than is possible via the machine's mains.

From this internal electric component, the voltage of which can be adjusted to optimal operation of the array constantly, provided the electronic power elements allow this, one or preferably two or more electric power exchange couplings branch off.

The first electric coupling goes via the electronic power elements to the electric connection of the second motor 11, which can transform electric power at a speed level basically independent of the first motor 10 into mechanical power. In the preferred variant of this array, this mechanical power serves to operate a turbo engine, such as a turbocharger, thus making the advantage of turbo engine operation independent of the combustion engine speed possible. Compared with the known electrically operated turbochargers, this array also offers the major advantage that the turbocharger power is not necessarily drawn entirely from the machine's mains 14, but is exchanged completely or partly with the combustion engine via the first motor 10. This means that there is considerably less stress on the machine's mains, and it allows a power exchange on a more favourable electric voltage level, whereby the wiring and the electronic power components can be designed more favourably. The power exchange can be bi-directional. In the same way, further electric motors as a part of the invention can be coupled to the internal electric part for the operation of additional aggregates, such as e.g. water pumps, ventilators, compressors, etc.

The second electric coupling is connected to the machine's mains via an electronic voltage adjustment circuit in accordance with the state of the art. As a result, power can be exchanged between the internal electric part and the machine's mains 14. Thus, the first electric motor 10 can be operated as a starter in one power direction and

as a machine's mains charging device in the other direction. The major advantage of this operating mode lies in the fact that a separate starter and a separate generator are not required, since these functions are provided by the array. A major advantage over known arrays lies in the fact that the starter can now be designed and operated as a motor with optimal voltage level, so that the known problems with high currents in the motor and also in the electronic power elements connected to the motor phases are avoided.

Furthermore, the second motor 11 can also be operated via the machine's mains 14 independent of the combustion engine, e.g. even when it is switched off. This means that the turbocharger can, for example, be started while the combustion engine is off, thus allowing a better starting process. Compared with known solutions, this solution offers the advantage that the second motor and the power electronics on the motor side can be designed and operated at an optimal voltage level.

In a further embodiment, an additional three-phase, alternating or direct current network can be provided by the internal electric circuit. For example, a strong 230 V supply or 3x400 V supply can be decoupled, whereby the frequency can be specified either internally or externally. Thus, the machine's mains 14 and the aggregates connected to it are connected to this supply in terms of power via the internal electric circuit.

As a result, the combustion engine can be started from the power supply without requiring the machine's mains, for example, or vice versa the combustion engine can support or charge an existing supply. It is also possible to charge the machine's mains battery from the supply in a simple manner.

In accordance with Fig. 3, the first electric motor 10 and the second electric motor 11 are mounted in the casing 9.

For cooling, the casing 9 can have cooling channels 16. In the area of these well-cooled casing components, an electronic power and control circuit including electric, magnetic and mechanical components, such as semiconductors 19, capacitors 18,

throttles, relays or the like and any required carrier materials 17 can be arranged in order to realize the functions in accordance with the elements, such as the control and power component 12, 13, 15 in Fig. 2, advantageously.

5 A further embodiment of the electric motor is shown in Figures 4 and 5. Thereby, the two electric motors 10, 11 can be arranged on top of each other, and the rotor output can be provided on the left and/or right of each motor. Thereby, the electronic component 20 can also be integrated in this motor casing.

10 Fig. 6 shows a three-phase electric motor, whereby this electric motor may be the first or the second electric motor. The rotor of the first electric motor is, for example, mechanically connected via a rotating shaft to the combustion engine. The rotor of the second electric motor is coupled with a rotating component, for example a turbo engine. For the exchange of electric power at a freely selectable voltage level, the first electric
15 motor is electrically connected to the second electric motor.

The stator 21 of at least one of the two electric motors has at least two winding systems 22 and 23. The two winding systems 22, 23 are preferably galvanically separated in the electric motor and magnetically coupled with the main flux of the motor. Due to
20 the galvanic separation, i.e. each winding system 22, 23 lies preferably in its own grooves, EMC interference from switching in one winding system 22, 23 can be suppressed.

The two winding systems 22, 23 are connected via separate electronic power
25 circuits 24, 25 to individual power circuits which are also preferably galvanically separated. Thus, the winding system 22 can be connected via the electronic power circuit 24, for example a rectifier bridge or a transistor bridge with a direct current or battery-fed mains, preferably with the machine's mains 26, for power exchange in one or both directions. Naturally, this winding system 22 could also be operated as a motor,
30 preferably as the starter for a combustion engine.

Via the electronic power circuit 25, a mains 27 can be supplied. Equally, this electronic power circuit 25 can also be electrically connected via the internal mains to an electronic power module 28 for the second electric motor 29.

5 Each winding system 22, 23 is connected, galvanically independent of the other winding system 22, 23, with electromechanical function groups on generally different voltage levels. Thus, the electromechanical function groups, e.g. an electrically operated oil pump or water pump, or an electromagnetically operated valve control for in- and output valves or motor valves, or an electrically operated ventilator can be operated
10 independent of the power limitation of the direct current or the battery at an advantageous voltage and/or current level.

The winding systems 22, 23 can have a weak magnetic coupling, for example if the winding systems are located in different grooves, or even a close magnetic coupling,
15 if both winding systems 22, 23 are located in one groove.

Fig. 7 shows a generator, for example as the first electric motor 10, and a compressor engine as the second electric motor 11. The two electric motors are electrically connected via a generator inverter 32 and a compressor motor inverter 33.
20 Uzk refers to the intermediate circuit voltage.

The generator is connected via its rotor to a motor, in particular a combustion engine, through a gearbox 35. The compressor motor 31 is connected via its rotor to a turbo engine 34. A winding system 22, 23 is connected via an electronic power circuit 4
25 to a machine's mains 6, whereby the winding systems 22, 23 can be separated galvanically.

Thereby, the first and the second electric motor can be mounted in a casing. Equally, the first and the second motor may have rotors with the same axis of rotation.
30

For form's sake, it is noted that for a better understanding of the invention the

components are illustrated partly untrue to scale and/or are enlarged and/or made smaller.

Journal of the American Medical Association

27 15

09/926796

531 Rec'd PCT/PT 20 DEC 2001

New Patent Claims:

ART 34 AMDT

1. Electric motor, preferably of the three-phase type, whereby a first electric motor (10) is provided, which is mechanically connected via the rotor (5) thereof to a rotating shaft of an engine, especially of an internal combustion engine, and in addition at least one second electric motor (11) is provided, which is mechanically coupled via the rotor (6) thereof to a rotating part of a mechanical aggregate, characterized by the fact that the first electric motor (10) is electrically coupled via electronic power elements to at least the second electric motor (11) in order to exchange electric power at a freely selectable voltage level.
2. Electric motor in accordance with Claim 1, characterized by the fact that the second electric motor (11) is mechanically connected via the rotor (6) thereof to the rotating part of a turbo engine.
3. Electric motor in accordance with Claim 1 or 2, characterized by the fact that the first electric motor (10) is mechanically connected via the rotor (5) thereof to a rotating shaft or to the shaft of a combustion engine mechanically connected to the rotating shaft.
4. Electric motor in accordance with Claim 1 or 2, characterized by the fact that the electric motor (10) is mechanically connected via a gearbox to the combustion engine.
5. Electric motor in accordance with Claim 1 or 2, characterized by the fact that the first electric motor (10) is a part of the combustion engine, e.g. that the rotor (5) of the first electric motor (10) is integrated in the flywheel of the combustion engine.
6. Electric motor in accordance with at least one of Claims 1 to 5, characterized by the fact that the first electric motor (10) is connected to at least one external electric circuit, preferably a machine's mains (14).
7. Electric machine in accordance with at least one of Claims 1 to 6, characterized by the fact that the first (10) and second electric motor (11) are mounted in a casing (9).
8. Electric motor in accordance with at least one of Claims 1 to 7, characterized by the fact that the first (10) and/or the second electric motor (11) are designed as an asynchronous, synchronous or reluctance motor.
9. Electric motor in accordance with at least one of Claims 1 to 8, characterized by the fact that the first (10) and second electric motor (11) have rotors (5, 6) with the same axis of rotation.

10. Electric motor in accordance with at least one of Claims 1 to 9, characterized by the fact that one of the two motors (10, 11) is designed as an inner rotor and the other motor is designed as an outer rotor.

5 11. Electric motor in accordance with at least one of Claims 1 to 10, characterized by the fact that the two electric motors (10, 11) have a mutual stator plate package.

10 12. Electric motor in accordance with at least one of Claims 1 to 11, characterized by the fact that the components for electric power exchange between the electric motors (10, 11) and/or an external electric circuit (14) are mounted in a casing (9) with at least one electric motor (10, 11).

15 13. Electric motor in accordance with at least one of Claims 1 to 12, characterized by the fact that the casing (9) of at least one electric motor (10, 11) has a liquid cooling system.

20 14. Electric motor in accordance with at least one of Claims 1 to 13, characterized by the fact that a mains connection with direct current, alternating current or three-phase current can be derived from the electric circuit connecting the two electric motors.

25 15. Electric motor in accordance with at least one of Claims 1 to 14, characterized by the fact that the stator (1, 4) of at least one electric motor (10, 11) has at least two winding systems (22, 23), preferably galvanically separated in the motor (10, 11), that are coupled magnetically with the main flux of the motor (10, 11).

30 16. Electric motor in accordance with at least one of Claims 1 to 15, characterized by the fact that the at least two winding systems (22, 23) are connected via separate electronic power circuits (24, 25) with the relevant, preferably galvanically separated power circuits.

35 17. Electric motor in accordance with at least one of Claims 1 to 16, characterized by the fact that at least one winding system (22, 23) is connected via a rectifier bridge to a direct current or battery-fed mains, preferably a machine's mains (26) for power exchange in one direction.

18. Electric motor in accordance with at least one of Claims 1 to 17, characterized by the fact that at least one winding system (22, 23) is connected via a transistor bridge to a direct current or battery-fed mains, preferably a machine's mains (26) for power exchange in both directions.

19. Electric motor in accordance with at least one of Claims 1 to 18, characterized by the fact that with at least one of the winding systems (22, 23) the motor can be operated as a generator for charging the connected machine's mains (26) and as a motor, preferably as the starter for a mechanically coupled combustion engine.

5

20. Electric motor in accordance with at least one of Claims 1 to 19, characterized by the fact that via the at least two winding systems (22, 23), a galvanically separable electric power exchange between the circuits connected to the winding systems (22, 23) is possible.

10

21. Electric motor in accordance with at least one of Claims 1 to 20, characterized by the fact that the winding systems (22, 23) controlled via the electronically controlled switches take over the control of the electric parameters from winding systems coupled via non-controllable electronic power elements, preferably diodes.

15

22. Electric motor in accordance with at least one of Claims 1 to 21, characterized by the fact that each winding system (22, 23) is connected, galvanically independent of the other winding system (22, 23), with electromechanical function groups on generally different voltage levels.

20

23. Electric motor in accordance with at least one of Claims 1 to 22, characterized by the fact that an electromagnetic power exchange between the winding systems (22, 23) independent of rotor rotation according to the transformer principle is possible through close magnetic coupling of the winding systems (22, 23).

25

24. Electric motor in accordance with at least one of Claims 1 to 23, characterized by the fact that a slight electromagnetic influence on the winding systems (22, 23) results from weak magnetic coupling of the winding systems (22, 23).

30

25. Electric motor in accordance with at least one of Claims 1 to 24, characterized by the fact that a freely selectable electromagnetic power exchange between the winding systems (22, 23) and the rotor shaft can be achieved by controlling the electromagnetic parameters, preferably the currents and flux linking, of at least one winding system (22, 23).

35

26. Electric motor in accordance with at least one of Claims 1 to 25, characterized by the fact that the first and second electric motor (10, 11) are mounted in a casing.

27. Electric motor in accordance with at least one of Claims 1 to 26, characterized by the fact that the first and/or the second electric motor (10, 11) are designed as an asynchronous, synchronous or reluctance motor.

20 | 8

ART 34 AMDT

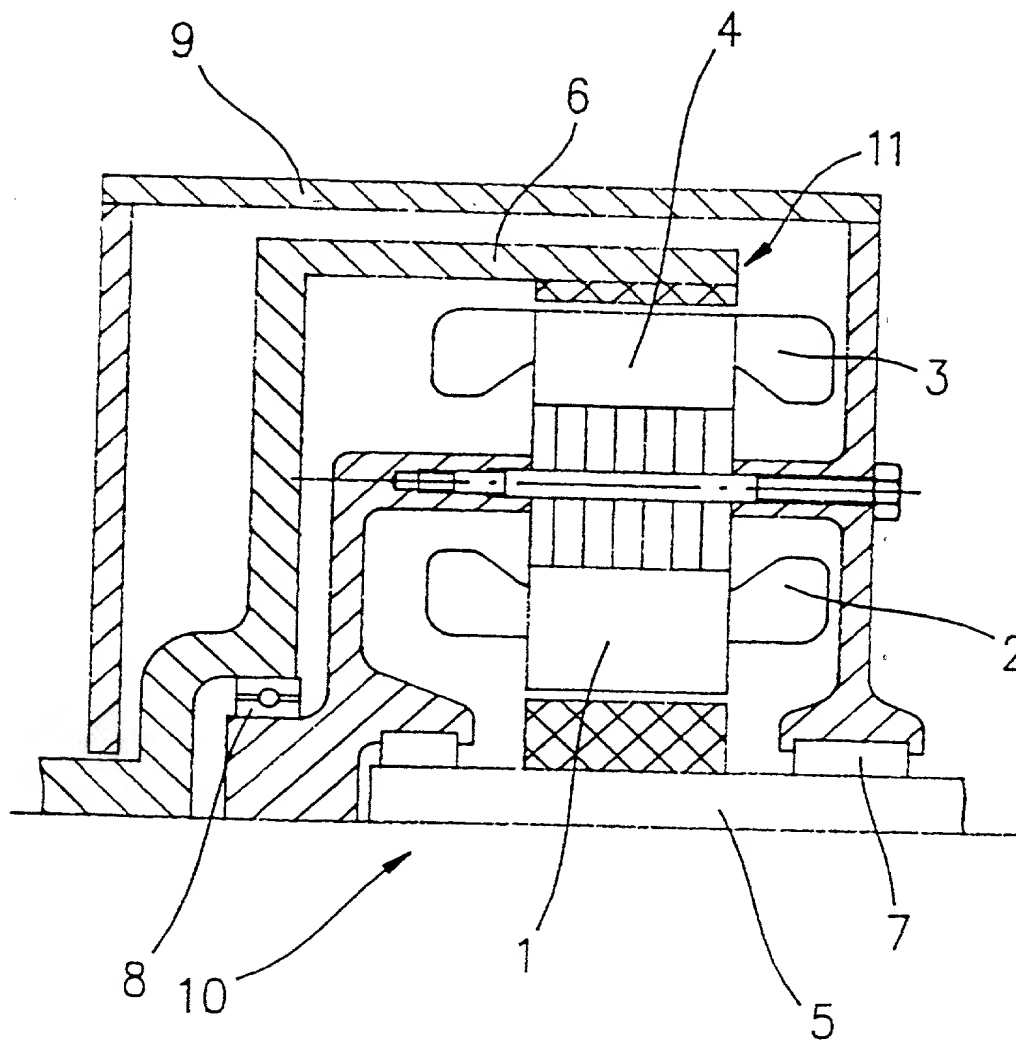
28. Electric motor in accordance with at least one of Claims 1 to 27, characterized by the fact that the first and second electric motor (10, 11) have rotors with the same axis of rotation.

5

Schrödl Manfred
represented by
Krause Peter
(VM No. 40709)

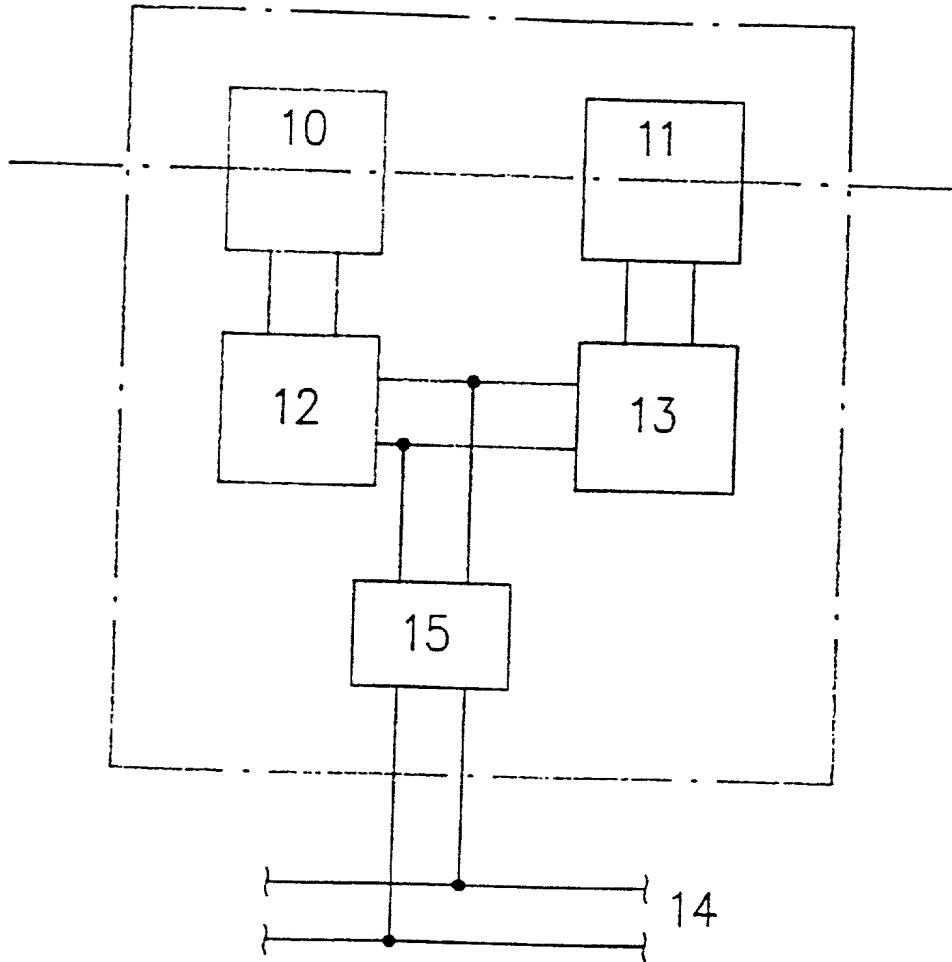
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85
86
87
88
89
90
91
92
93
94
95
96
97
98
99
100

Fig. 1



09/926796

Fig. 2



T 0022 962650

09/926796

Fig. 3

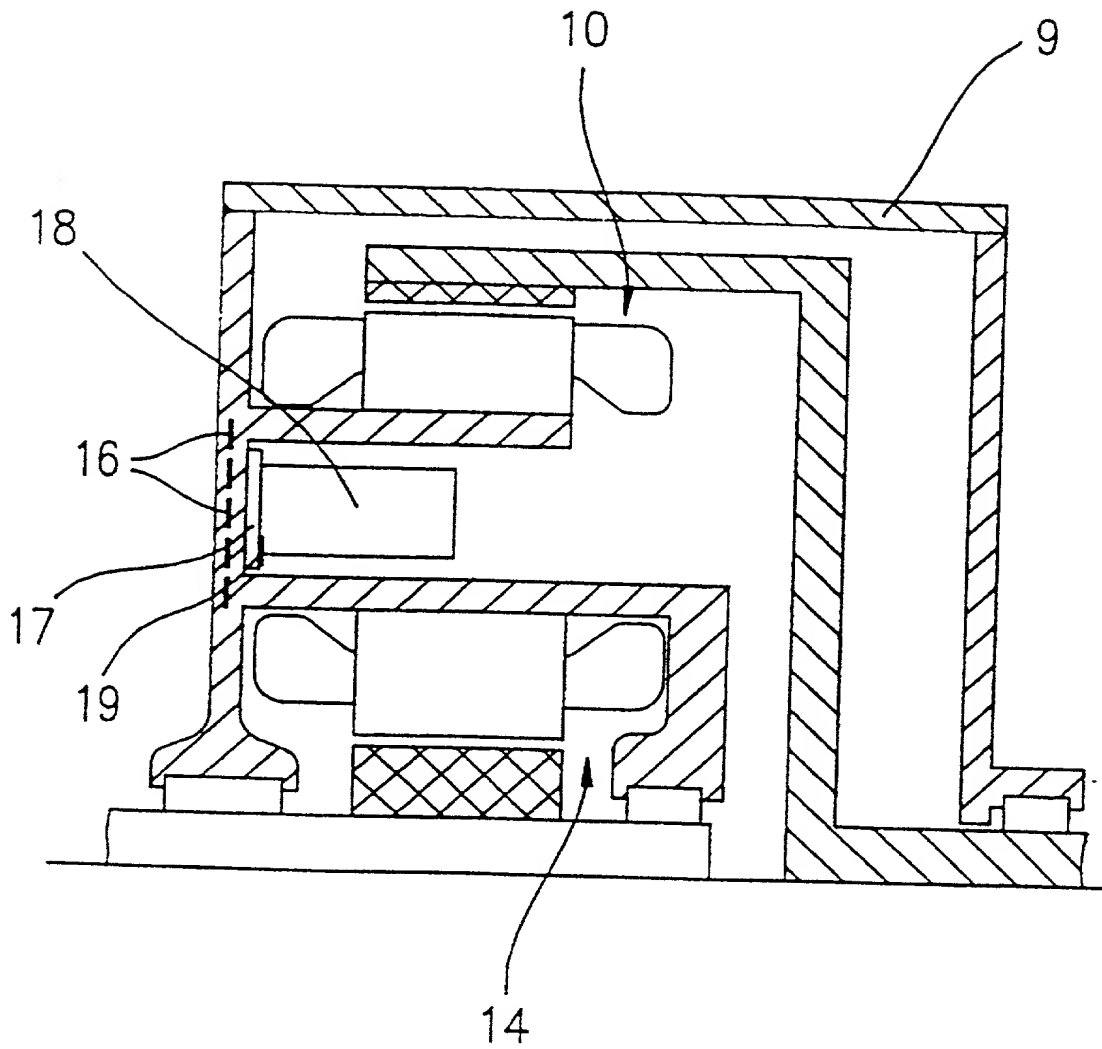
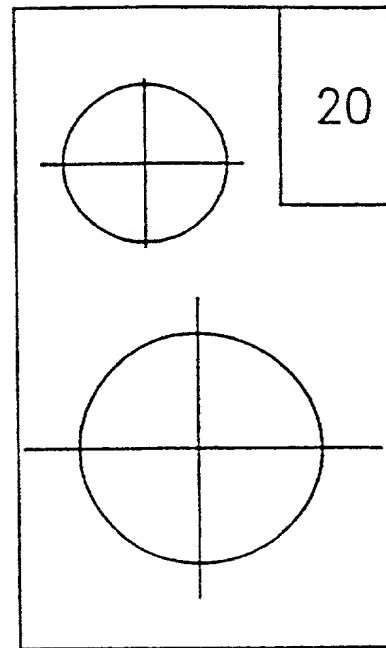
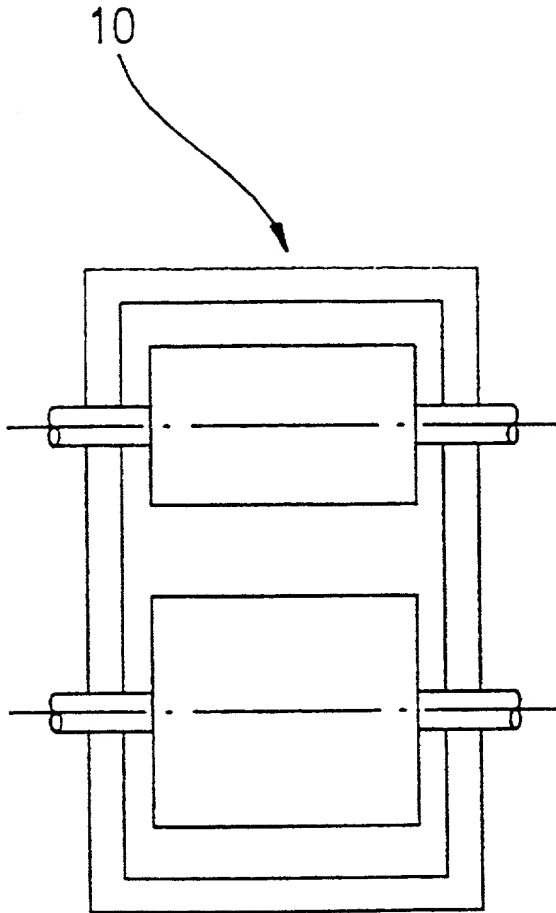


Fig. 4

Fig. 5



09/926796

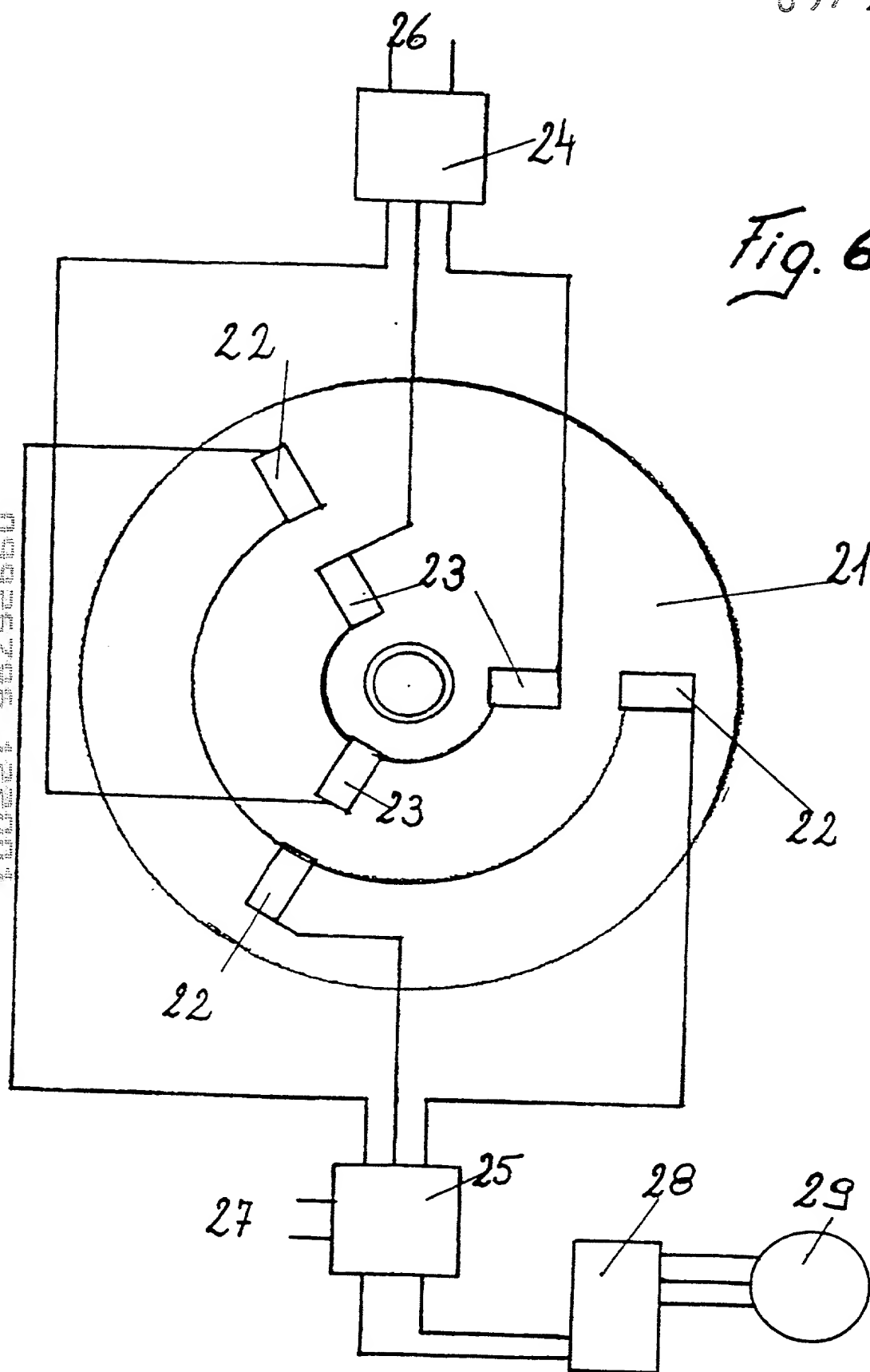
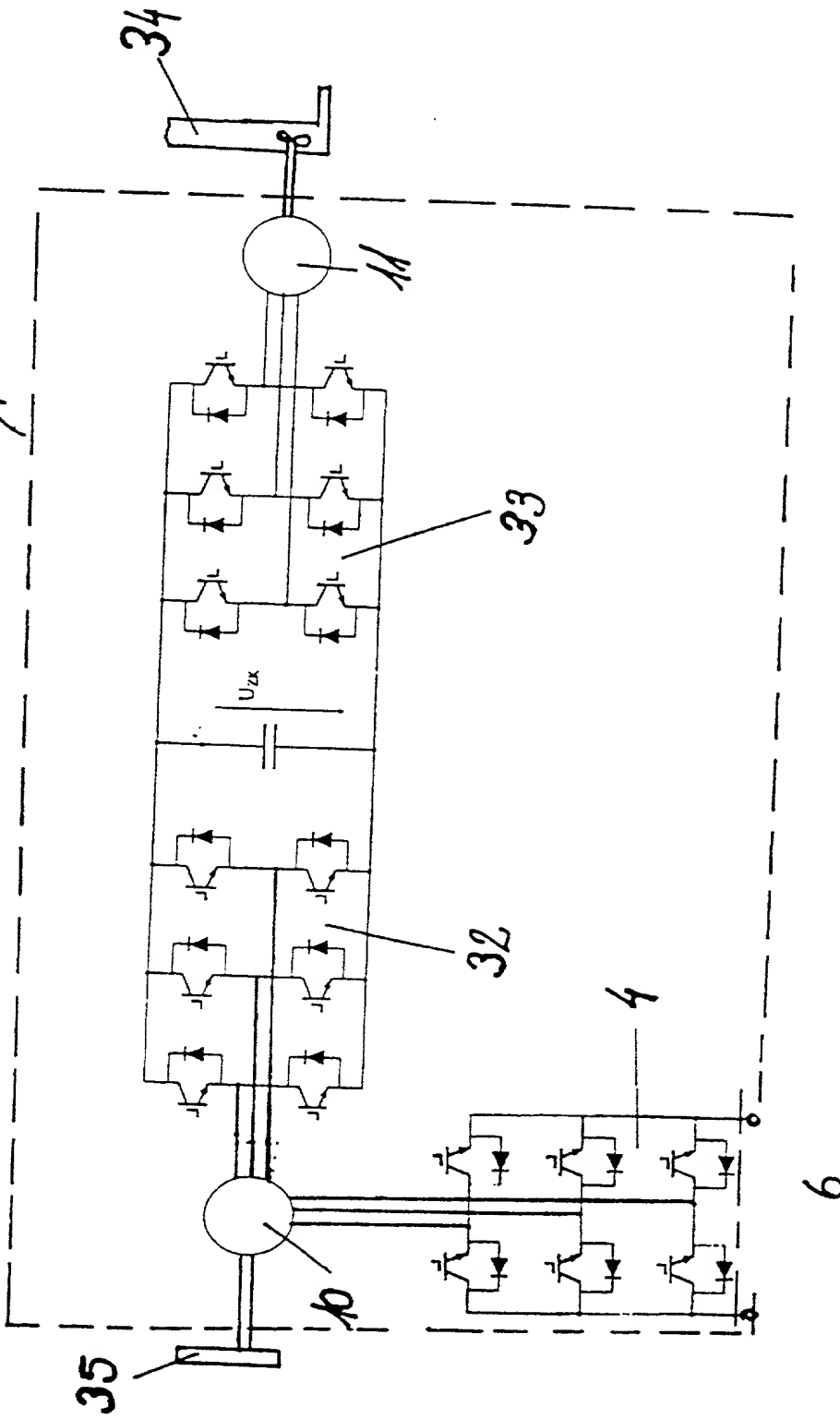
Fig. 6

Fig. 7



r hierin bezeugt, dass die Erfindung neu ist und

703-716-1180

5:46PM

DEC. 17. 2001

21760.DC1

Page 1 of 3

Declaration and Power of Attorney For Utility or Design Patent ApplicationErklärung für Patentanmeldungen zur Gebrauchseignung und Entwicklung
mit Vollmacht**German Language Declaration**Als nachstehend benannter Erfinder erkläre ich hiermit an Eides
Statt:

daß mein Wohnsitz, meine Postanschrift und meine Staats-
angehörigkeit den im nachstehenden nach meinem Namen
aufgeführten Angaben entsprechen, daß ich nach bestem Wissen der
ursprüngliche, erste und alleinige Erfinder (falls nachstehend nur ein
Name angegeben ist) oder ein ursprünglicher, erster und Miterfinder
(falls nachstehend mehrere Namen aufgeführt sind) des
Gegenstandes bin, für den dieser Antrag gestellt wird und für den
ein Patent für die Erfindung mit folgendem Titel beantragt wird:
ELEKTRISCHE MASCHINE

deren Beschreibung hier beigelegt ist, es sei denn (in diesem Falle
Zutreffendes bitte ankreuzen), diese Erfindung

☒ wurde angemeldet am 21. Juni 2000
unter der US-Anmeldenummer _____
und wurde am _____ abgeändert (falls zutreffend)
oder

unter der PCT internationalen Anmeldungsnummer _____
PCT/AT00/00167

und wurde am 3. August 2001 abgeändert (falls zutreffend).

Ich bestätige hiermit, daß ich den Inhalt der oben angegebene Paten-
tanmeldung, einschließlich der Ansprüche, die eventuell durch einen
oben erwähnten Zusatzantrag abgeändert wurde, durchgesehen und
verstanden habe.

Ich erkenne meine Pflicht zur Offenbarung jeglicher Informationen
an, die zur Prüfung der Patentfähigkeit in Einklang mit Titel 37,
Code of Federal Regulations, § 1.56 von Belang sind.

Ich beanspruche hiermit ausländische Prioritätsvorteile gemäß Title
35, US-Code, § 119 (a)-(d), bzw. § 365(b) aller unten aufgeführten
Auslandsanmeldungen für Patente oder Erfinderurkunden, oder §
365(a) aller PCT internationalen Anmeldungen, welche wenigstens
ein Land ausser den Vereinigten Staaten von Amerika benennen, und
habe nachstehend durch ankreuzen sämtliche Auslandsanmeldungen
für Patente bzw. Erfinderurkunden oder PCT internationale
Anmeldungen angegeben, deren Anmeldetag dem der Anmeldung,
für welche Priorität beansprucht wird, vorangeht.

Prior Foreign Applications

Frühere ausländische Anmeldungen

<u>A 1081/99</u>	<u>Austria</u>
(Number)	(Country)
(Number)	(Land)
<u>A 2115/99</u>	<u>Austria</u>
(Number)	(Country)
(Number)	(Land)

☐ Zusätzliche einstweilige Anmeldungsnummern sind im
Prioritätsanhang aufgeführt.

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated
below next to my name.

I believe I am the original, first and sole inventor (if only one
name is listed below) or an original, first and joint inventor (if
plural names are listed below) of the subject matter which is
claimed and for which a patent is sought on the invention entitled

ELECTRIC MOTORthe specification of which is attached hereto unless the following
box is checked:

☒ was filed on June 21, 2000 _____ as
United States Application Number _____
and was amended on _____ (if applicable)
or,

PCT International Application Number PCT/AT00/00167
and was amended on August 3, 2001 (if applicable).

I hereby state that I have reviewed and understand the contents of
the above identified specification, including the claims, as
amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material
to patentability as defined in Title 37, Code of Federal
Regulations, § 1.56.

I hereby claim foreign priority under Title 35, United States Code
§ 119 (a-d) or § 365(b) of any foreign application(s) for patent or
inventor's certificate, or § 365(a) of any PCT international
application which designated at least one country other than the
United States, listed below. I have also identified below, by
checking the "No" box, any foreign application for patent or
inventor's certificate, or of any PCT international application
having a filing date before that of the application on which
priority is claimed:

Priority Claimed
Prioritätsanspruch

<u>21/June/1999</u>
(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)
<u>15/December/1999</u>
(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)

<input checked="" type="checkbox"/>	<input type="checkbox"/>
Yes	No
Ja	Nein
<input checked="" type="checkbox"/>	<input type="checkbox"/>
Yes	No
Ja	Nein

☐ Additional foreign application numbers are listed
on a supplemental priority sheet attached hereto.

21760.DCI

Page 2 of 3

German Language Utility or Design Patent Application Declaration

Ich beanspruche hiermit Prioritätsvorteile unter Title 35, US-Code, § 119(e) aller US-Hilfsanmeldungen wie unten aufgezählt.

(Application Number)
(Aktenzeichen)

(Application Number)
(Aktenzeichen)

(Application Number)
(Aktenzeichen)

- ☐ Zusätzliche einseitige Anwendungsnummern sind im ergänzenden Prioritätsanhang aufgeführt.

Ich beanspruche hiermit die mir unter Title 35, US-Code, § 120 zustehenden Vorteile aller unten aufgeführten US-Patentanmeldungen bzw. § 365(c) aller PCT internationalen Anmeldungen, welche die Vereinigten Staaten von Amerika benennen, und erkenne, insofern der Gegenstand eines jeden früheren Anspruchs dieser Patentanmeldung nicht in einer US-Patentanmeldung, bzw. PCT internationalen Anmeldung in in einer gemäß dem ersten Absatz von Title 35, US-Code, § 112 vorgeschriebenen Art und Weise offenbart wurde, meine Pflicht zur Offenbarung jeglicher Informationen an, die zur Prüfung der Patentfähigkeit in Einklang mit Title 37, Code of Federal Regulations, § 1.56 von Belang sind und die im Zeitraum zwischen dem Anmeldetag der früheren Patentanmeldung und dem nationalen oder im Rahmen des Vertrags über die Zusammenarbeit auf dem Gebiet des Patentwesens (PCT) gültigen internationalen Anmeldetags bekannt geworden sind.

(Application No.)
(Aktenzeichen)

(Day/Month/Year Filed)
(Tag/Monat/Jahr eingereicht)

(Application No.)
(Aktenzeichen)

(Day/Month/Year Filed)
(Tag/Monat/Jahr eingereicht)

- ☐ Zusätzliche USA oder internationale Anwendungsnummern sind im ergänzenden Prioritätsanhang aufgeführt.

Ich erkläre hiermit, daß alle in der vorliegenden Erklärung von mir gemachte Angaben nach bestem Wissen und Gewissen der Wahrheit entsprechen, und ferner daß ich diese eidesstattliche Erklärung in Kenntnis dessen ablege, daß wissentlich und vorsätzlich falsche Angaben oder dergleichen gemäß § 1001, Title 18 des US-Code strafbar sind und mit Geldstrafe und/oder Gefängnis bestraft werden können und daß derartige wissentlich und vorsätzlich falsche Angaben die Rechtswirksamkeit der vorliegenden Patentanmeldung oder eines aufgrund deren erteilten Patentes gefährden können.

Hiermit bevollmächtigt der Unterzeichnete den hierin genannten entweder USA-Anwalt oder Stellvertreter, in der Abwesenheit einer direkten Verständigung zwischen den USA-Anwalt oder Stellvertreter und dem Unterzeichneten Anweisungen, die der der Anmeldung betreffend dem Patent und Warenzeichen Amt zugestellt werden, von entweder seinem ausländischen Patentvertreter oder Stellvertreter der Gesellschaft anzunehmen und auszuführen. Sollte sich das Personal ändern, von dem

I hereby claim the benefit under Title 35, United States Code § 119(e) of any United States provisional application(s) listed below.

(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)

(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)

(Day/Month/Year Filed)
(Tag/Monat/Jahr der Anmeldung)

- ☐ Additional provisional application numbers are listed on a supplemental priority sheet attached hereto.

I hereby claim the benefit under Title 35, United States Code § 120 of any United States application(s), or § 365(c) of any PCT international application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT international application in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Status)
(patentiert, schwebend, aufgegeben)
(patented, pending, abandoned)

(Status)
(patentiert, schwebend, aufgegeben)
(patented, pending, abandoned)

- ☐ Additional U.S. or international application numbers are listed on a supplemental priority sheet attached hereto.

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

The undersigned hereby authorizes the U.S. attorney or agent named herein to accept and follow instructions from either his foreign patent agent or corporate representative, if any, as to any action to be taken in the Patent and Trademark Office regarding this application without direct communication between the U.S. attorney or agent and the undersigned. In the event of a change in the persons from whom instructions

21760.DC1

German Language Utility or Design Patent Application Declaration

VERTRETUNGSVOLLMACHT: Als benannter Erfinder beauftrage ich hiermit den sich mit der Kundennummer befassenden Patentanwalt (Patentanwälte) und/oder Patent-Agenten mit der Verfolgung der vorliegenden Patentanmeldung sowie mit der Abwicklung aller damit verbundenen Geschäfte vor dem Patent- und Warenzeichenamt und weise an, dass alle Korrespondenz mit dieser Kundennummer adressiert wird.

POWER OF ATTORNEY: As a named inventor, I hereby appoint the attorney(s) and/or agent(s) associated with the Customer Number provided below to prosecute this application and transact all business in the Patent and Trademark Office connected therewith, and direct that all correspondence be addressed to that Customer Number:

KUNDENNUMMER 7055

CUSTOMER NUMBER 7055

Die ernennten Patentanwälte sind zur Zeit:

Neil F. Greenblum Reg. No. 28,394
 Bruce H. Bernstein Reg. No. 29,027
 Arnold Turk Reg. No. 33,094
 James L. Rowland Reg. No. 32,674

The appointed attorneys presently include:

Stephen M. Roylance Reg. No. 31,296
 Leslie J. Paperner Reg. No. 33,329
 William Pieprz Reg. No. 33,630
 William E. Lyddane Reg. No. 41,568

Address: Greenblum & Bernstein, P.L.C.
 1941 Roland Clarke Place
 Reston, VA 20191

Telefongespräche bitte richten an:

Direct Telephone Calls to:

Greenblum & Bernstein, P.L.C.
 (703) 716-1191

Vor- und Nachname des einzigen oder ersten Erfinders:
Manfred SCHROEDL

Full name of sole or first inventor
Manfred SCHROEDL

Unterschrift des Erfinders

Datum:

Manfred

19.12.2001

Inventor's signature

Date

Manfred

19.12.2001

Wohnsitz
 Siegraben, Österreich

Residence
 Siegraben, Austria

AT

Staatsangehörigkeit
 Österreich

Citizenship
 Austria

Postanschrift
 Untere Hauptstrasse 9, A-7223 Siegraben, Österreich

Post Office Address
 Untere Hauptstrasse 9, A-7223 Siegraben, Austria

Vor- und Nachname des zweiten Miterfinders (falls zutreffend)

Full name of second joint inventor, if any

Unterschrift des zweiten Erfinders

Datum

Second Inventor's Signature

Date

Wohnsitz

Residence

Staatsangehörigkeit

Citizenship

Postanschrift

Post Office Address

(Bitte entsprechende Informationen und Unterschriften im Falle von dritten und weiteren Miterfindern angeben).

(Supply similar information and signature for third and subsequent joint inventors).